POWER ForeArms!

from Health For Life

THE THEORY

For most athletes—especially bodybuilders and martial artists—the forearms are the seat of strength. You can be incredibly "strong," but if you don't have **the grip** to hang on to that bar, javelin, or nunchaku, or the forearm **solidity** to deliver the power behind that right cross, the strength is all for nothing.

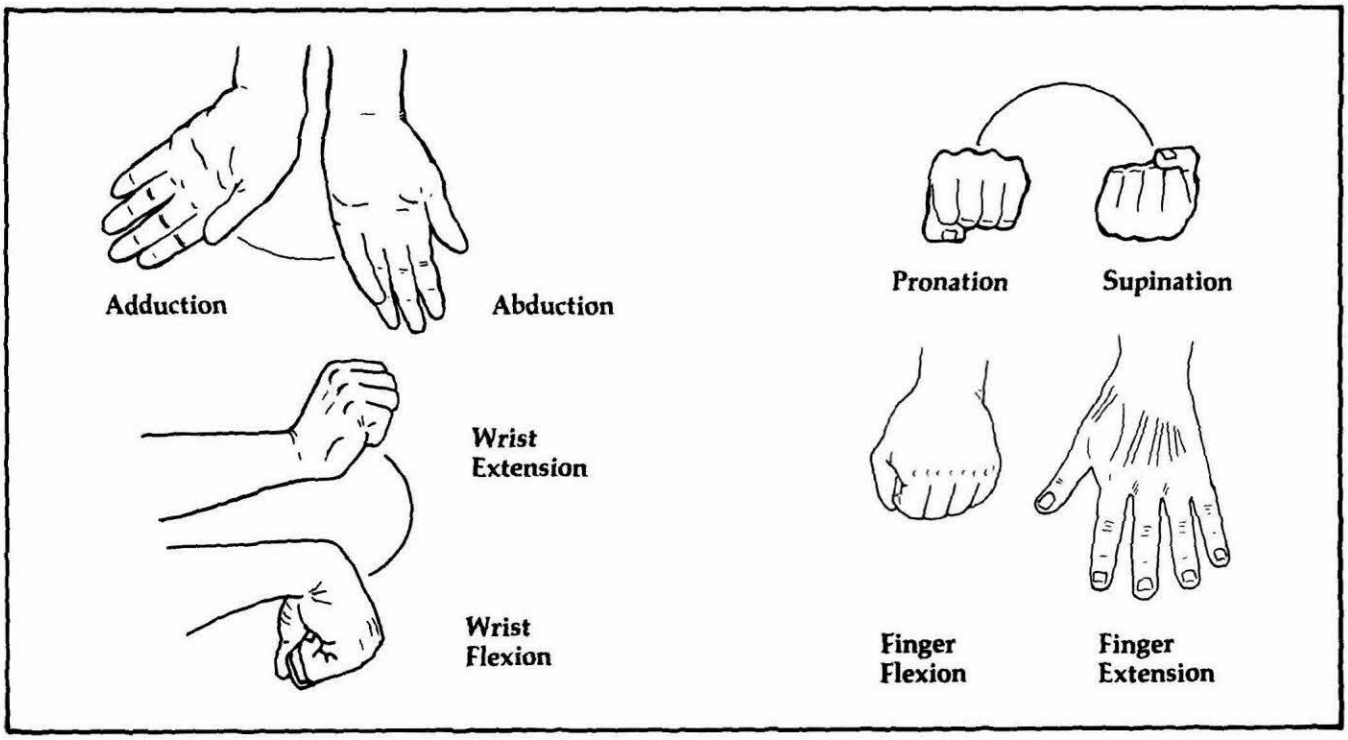
To develop these forearm characteristics—grip and solidity—you must work for *balanced strength* around the associated forearm joints. Before we can talk about that, though, we must briefly touch on forearm motions.

There are basically six, grouped in pairs: wrist flexion and extension, wrist abduction and adduction, and forearm supination and pronation. In addition, we need to consider one pair of finger motions: finger flexion and extension.

Don't worry too much about the names. The important point is that each of these motions is the result of several individual forearm muscles working together in *groups*. Muscle groups work against one another in pairs to provide stability much like the guy-wires on opposite sides of a tent pole. (See box on page 4.)

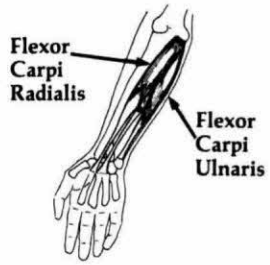
There is, as it turns out, one oddball that messes up this symmetry: the **brachioradialis.** It has no muscle group working against it in the *forearm*. The brachioradialis acts with two upper arm muscles, the biceps and brachialis, to bend the elbow. Their opposing muscle group, the triceps, is in the *upper arm*.

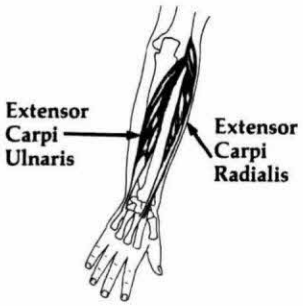
Any comprehensive forearm program should aim to develop all the major forearm muscles. Achieving **balanced development** requires devoting **equal effort** to the opposing muscle groups. Only with such a balanced approach will you achieve **functional strength**—and massive, ripped forearms, as well!. As an additional benefit, balanced forearm development will greatly reduce the risk of injuring your wrists during athletic pursuits.

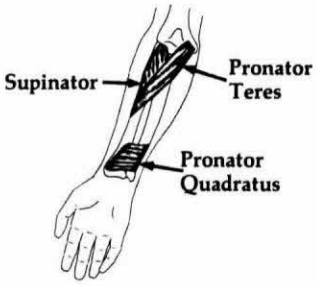


FOREARM MOVEMENTS AND THEIR MUSCLE GROUPS

We mentioned six forearm motions: wrist flexion/extension, wrist abduction/adduction, and forearm supination/pronation. Four of these motions—wrist flexion/extension and wrist abduction/adduction—result primarily from four muscles working together in different groups. The remaining two—forearm supination/pronation—result primarily from three other forearm muscles working in groups. (In both cases, there are a number of smaller muscles involved we will not worry about.)

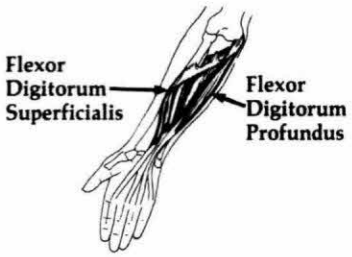






Movement	*Primary Muscles Involved*	*Movement*	*Primary Muscles Involved*
Wrist flexion	Flexor Carpi Ulnaris Flexor Carpi Radialis	Wrist adduction	Flexor Carpi Ulnaris Extensor Carpi Ulnaris
Wrist extension	Extensor Carpi Ulnaris Extensor Carpi Radialis	Forearm pronation	Pronator Teres Pronator Quadratus
Wrist abduction	Flexor Carpi Radialis Extensor Carpi Radialis	Forearm supination	Supinator

Additional muscles found in the forearm (thus relevant to forearm development) but not responsible for forearm movements include:



Movement	*Primary Muscles Involved*
Elbow flexion	Brachioradialis
Finger flexion	Flexor Digitorum (Finger flexors)
Finger extension	Extensor Digitorum (Finger extensors)

THE FATIGUE/TENSION PRINCIPLE

Researchers have spent a lot of time trying to figure out what makes muscles grow. They've understood pieces of the puzzle for some time—the idea of *overloading,* for example. We all know forcing muscles to lift more than we think possible is essential to growth.

We also know *timing* is important. Resting too long between sets seems to limit growth. So does not resting long enough between workouts. In fact, doing reps too slowly within a set kills results, too.

These two principles—overload and timing—have produced the well-known prescription for muscle growth/strength increase: three to five sets of six to eight reps performed at a moderate pace, no more than three times per week. Although the prescription is not particularly elaborate, it seems to work.

Now we introduce a new wrinkle. Recent research has shown that overload and timing are not independent of each other. It's not really a question of finding the **best timing** ("...rest no more than 45 seconds between sets...") and then determining the **optimal overload** ("...you have to lift at least 80% of your max to gain..."). *Rather, it's a question of the* ***best combination of timing plus overload,*** *with each affecting the other.*

Think of the overload as creating a particular **tension level** in a muscle. The greater the weight you lift, the greater the tension level:

Overload (amount of weight) ⟶ Tension level

Also, think of the speed with which you perform your reps and the time you rest between sets as creating a particular muscular **fatigue level.** The faster you work, and the less time between sets, the higher the level of fatigue:

Rep Speed, Short Rests between Sets ⟶ Fatigue level

In combination, these two act to create a new concept: the **Fatigue/Tension Level.** This is a way of expressing how fatigue and tension relate to one another. We can say...

Ideal Balance of Fatigue and Tension ⟶ Maximum Growth

Increase the fatigue level (faster reps, less time between sets), and it takes less tension (less weight) to achieve the same Fatigue/Tension level. Decrease fatigue (slower reps, more time between sets) and it takes more tension (more weight) to achieve the same Fatigue/Tension level.

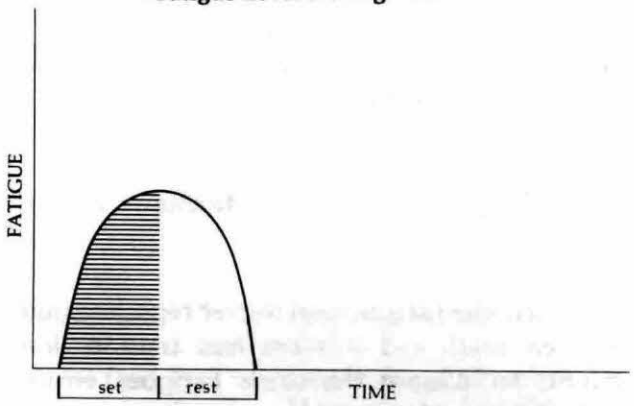
Now for the interesting part. It turns out that muscle growth depends not only on overloading, not only on timing, but on **surpassing a particular Fatigue/Tension level** called the **Fatigue/Tension Threshold.** Unless your exercise scheme (overload plus timing) bumps you over this threshold...no growth!

This has some interesting implications when we begin to structure an optimal workout. For one thing, it means **overall** workout speed is important, not just length of rest between sets, or speed of reps within sets.

Fatigue

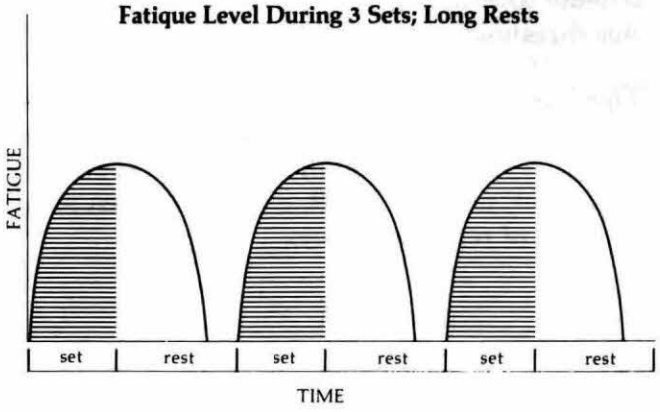
You see, for any particular muscle group, your fatigue level is **dynamic**, or constantly changing. Before you do a set, your fatigue level is low; during the set, it rises; as soon as you finish, it begins to drop again as your muscles recover from the effort. If you rest long enough, your fatigue level eventually will drop to the level from which it began.

Fatigue Level During 1 Set



A series of sets, with long rests in between, has a fatigue curve that looks like this:

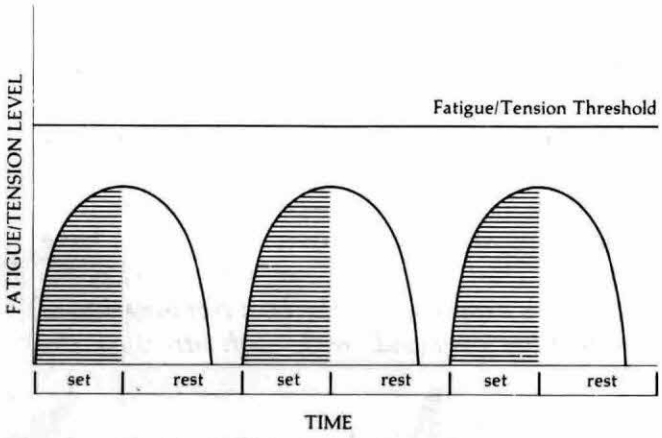
Fatique Level During 3 Sets; Long Rests



Notice that as a result of letting your fatigue level drop so low in between sets, there is no **cumulative fatigue effect** over several sets; you don't get more tired during the second set than during the first, nor more tired during the third than during the first.

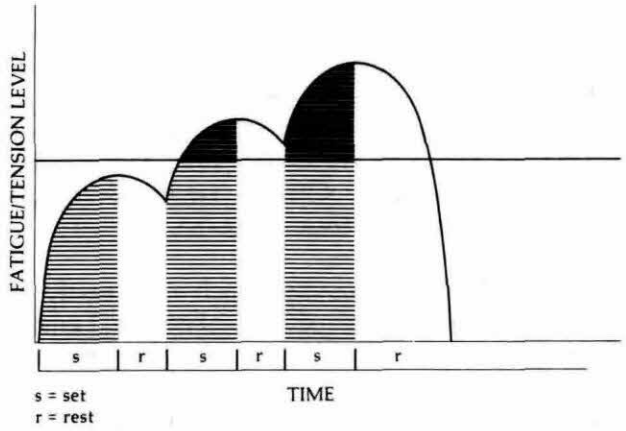
Even when you figure in the Tension factor, the basic shape of this curve looks the same. In other words, we can treat this as a picture of the Fatigue/Tension level.

Now, a few paragraphs back, we said there is a particular Fatigue/Tension **Threshold** you must surpass for muscle growth to occur. The graph below, which illustrates the Fatigue/Tension Threshold, shows why long rests impair progress. The long rests prevent successive sets from having any cumulative effect on your fatigue—thus you never cross the threshold.



As you shorten your rest time between sets, though, your fatigue level doesn't have time to drop as far, and you achieve a stair-step Fatigue/Tension curve that looks something like this:

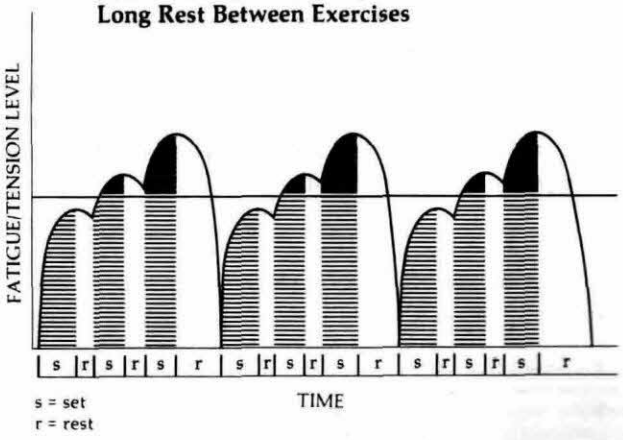
Fatigue/Tension During 3 Sets; Short Rests



Now we show a cumulative effect! And during the third set we finally surpass the Fatigue/Tension Threshold. Presto!—*growth.*

This is why shorter rests between sets facilitate increases in size and strength. The same principle applies to rests between different exercises for the same bodypart. After doing three or four sets of some exercise, the muscle(s) affected will show some cumulative fatigue level, assuming you are working fast and hard enough. If you rest too long before beginning the next exercise for that same muscle, your fatigue level will drop enough to prevent a cumulative fatigue effect across the different exercises:

Fatigue/Tension Level During 3 Exercises;
Short Rest Between Sets;
Long Rest Between Exercises

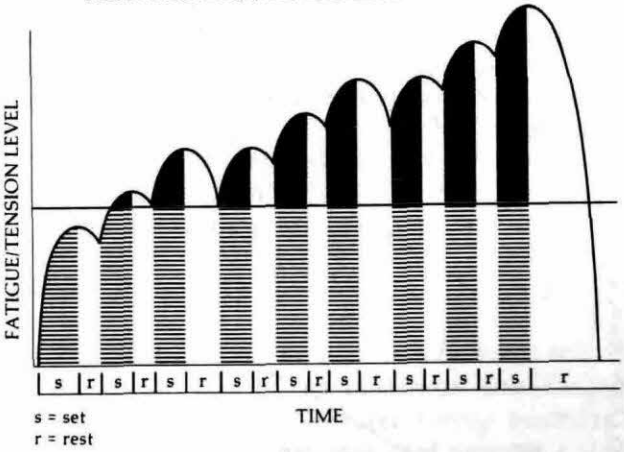


"So what?" you may say. "Assuming I've crossed the F/T Threshold during the first set, does it really matter if my fatigue level drops before the next exercise?"

Yes! Crossing the F/T Threshold is just the beginning of the growth process. It is crossing the Threshold, and **staying above it**, that assures greater development in less time.

This brings us full circle to our earlier point—overall workout speed and continuity is important, not just the length of rests between sets or the rep rate. When combining exercises for a particular bodypart, even if you don't surpass the F/T Threshold during your first exercise, you may during your second or third!

Fatigue/Tension Level During 3 Exercises;
Short Rest Between Sets;
Short Rest Between Exercises



Tension

Now let's turn to the question of tension within the Fatigue/Tension concept.

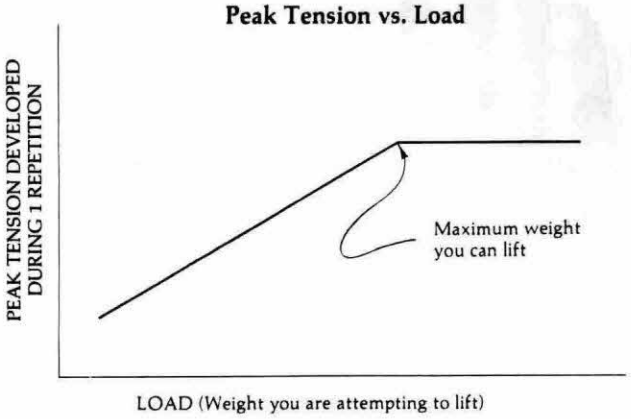
The tension generated within a muscle during exercise depends mostly on three things:

- the **load** (amount of weight) you are lifting,
- the **leverage** associated with the exercise movement,
- and the **mental focus**—oomph!—you put into your effort.

For simplicity's sake, let's assume you are going to put an all-out effort into every rep you do. This will make mental focus a constant.

Load

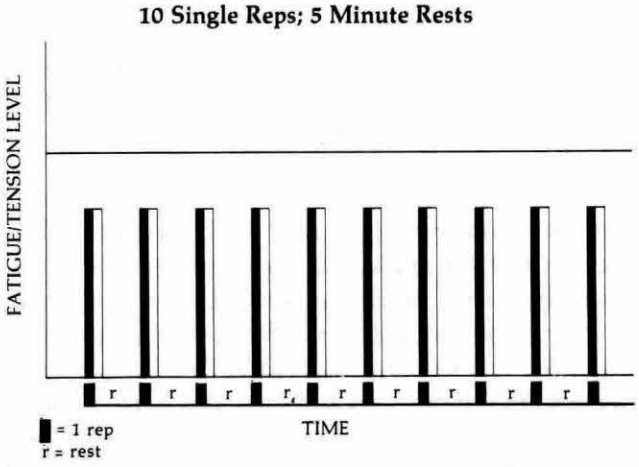
As for load, the relationship here is simple: Higher load (more weight), more tension...up to a point. As you do sets with a weight approaching the maximum you can lift, the tension within the muscle levels off:


Peak Tension vs. Load
PEAK TENSION DEVELOPED DURING 1 REPETITION
Maximum weight you can lift
LOAD (Weight you are attempting to lift)

Intuition and experience suggest heavier weights are required for building strength and bulk. Basically, that's true. But as we've mentioned, it's not just the weight that makes the difference.

Studies have been done in which a group of athletes/bodybuilders did 3 to 5 sets of various exercises with about 80% of the maximum weight they could lift. Each set consisted of one all-out rep followed by five minutes' rest, then another rep and another rest, and so on until each test subject had performed ten reps total. The athletes followed the regime three times per week for several months. Then everyone was tested for strength and bulk gains. The results? Practically no gains! Only a small percentage showed any signs of improvement.

The failure of this approach can easily be explained in terms of the Fatigue/Tension Principle: Even with high tension, the low fatigue from long rests resulted in a Fatigue/Tension level below the Threshold.*

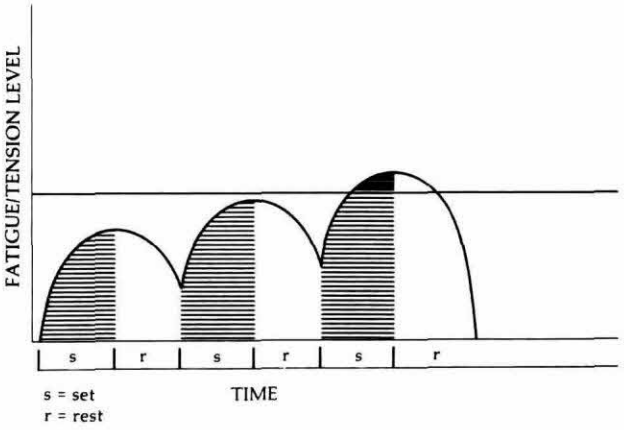


This is not to say a high load isn't effective or necessary for inducing growth. Quite the contrary. Using near-maximal poundages has a pronounced effect on the Fatigue/Tension curve. Assuming you structure your workout to take advantage of the Fatigue element—fast pace, short rests—using heavier weights raises the entire curve. It also makes the curve peak at a higher level, because heavier weights increase fatigue as well as tension.

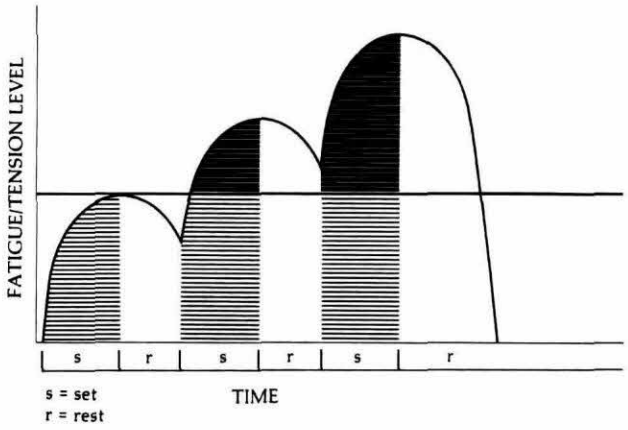
* It *is* possible to generate a tension level sufficient to compensate for the low fatigue from long rests. This requires using 95% to 100% of the maximum weight you can lift. Power lifters use this sort of workout. We do not recommend this for two reasons: (1) it puts potentially injurious stress on joints and ligaments; (2) it is not the most effective training program for the combined goals of strength, bulk, and definition.

Here are the curves for the same exercise done at the same pace, first with lighter weights, then with heavier:

Fatigue/Tension Level; Light Weight



Fatigue/Tension Level; Heavy Weight



Notice how much steeper the second curve is, and how much sooner it crosses the Fatigue/Tension threshold.

Leverage

We mentioned that three things affect the tension generated within a muscle during exercise: load, leverage, and mental focus.

Leverage is the most recent of these to be incorporated into workout routines. The last few years have seen the introduction of the "Eccentric Cam" into sophisticated weight training equipment—Nautilus machines, for instance. The Eccentric Cam is an acknowledgment that muscles do not have equal leverage throughout their range of motion. For example, when doing a bicep curl you have better leverage, and thus more strength, when you are about halfway through the curl than when you are at the bottom of the motion and your arm is fully extended.

As such, it takes more weight to generate the same tension within the muscle when your arm is bent than when it is extended. So a weight heavy enough to provide maximal resistance when your arm is bent is going to be much too heavy when your arm is extended.

In fact, each muscle has its own unique leverage curve. A good exercise pits a muscle against resistance that varies in relation to the muscle's leverage. This is not nearly as complicated as it sounds. Basically, it just means for you to perceive the resistance as constant, the resistance must vary to match your strength at all points throughout the range of motion.

Through an application of biomechanical principles, it's possible to design exercises that do not involve expensive equipment, but do provide the benefits of variable resistance. This leads to a higher Fatigue/Tension level, and faster growth!

The bottom line: an effective forearm routine must be structured to maximize the Fatigue/Tension level. It will involve heavy poundages and a pace and organization that ensures a stair-step fatigue effect. Also, it will include exercises adjusted to provide resistance closely matched to each forearm muscle group's leverage.

The application of the Fatigue/Tension principle within Power ForeArms! represents the program's primary synergism, allowing us to create a whole greater than the sum of the parts. The use of heavy weight alone does not ensure growth; nor does working fast. But the proper combination of the two elements produces tremendous results.

Further synergy results from the application of another principle...

INTERDEPENDENCY OF MUSCLE GROUPS

Research has demonstrated there is one particular sequence of a given series of exercises that affords maximum benefit to all muscles involved. This sequence makes each of the exercises more effective than those same exercises performed in random order. This optimal sequence is our second synergism, and is partly determined by a principle called "The Interdependency of Muscle Groups." Let us explain it this way...

Two of the muscle groups running up the back of your forearm are: the wrist extensors, which bend the hand back at the wrist, and the elbow flexors, specifically the brachioradialis, which acts in concert with muscles in your upper arm to bend your elbow.

You can't exercise your wrist extensors without calling the brachioradialis into play because of the interdependency of these two muscle groups. You can, however, exercise the brachioradialis separately. (Since we're concerned with forearms here, let's ignore upper arm involvement in brachioradialis motions.)

To work the Brachioradialis, you use:

BRACHIORADIALIS

To work Wrist Extensors, you use:

WRIST EXTENSORS + BRACHIORADIALIS

Notice the brachioradialis plays a role in the work you do for both areas. As a result, if you tire it first, it becomes the weak link in the chain, limiting the amount of wrist extensor work you can do. The solution: do wrist extensor work first. That way you can burn out the wrist extensors completely, then work the brachioradialis to its limit with exercises that concentrate on it.

As a side benefit, once the brachioradialis is tired from wrist extensor work, it won't need to be pushed as hard to get a good workout.

Bringing the finger flexors into the picture, we can make a similar argument for doing **all** forearm work before finger-flexor work. The finger flexors are involved any time you hold onto anything. If you tire these first, you may find yourself dropping barbells and dumbells right and left! Do finger flexors last.

The bottom line here: Exercise order, dictated by the Interdependency of Muscle Groups, can dramatically improve exercise efficiency. For forearms, this means doing wrist extensor work before brachioradialis work, and finger flexor work last.

A REVIEW

At this point, we have the information necessary to begin structuring an effective forearms program. Let's review before getting down to the specifics of the exercises.

1. We will be working to increase strength, mass, and definition of the major muscle groups in your forearms: wrist flexors/extensors, forearm supinators/pronators, finger flexors/extensors, plus the brachioradialis. Remember, developing balanced strength around the wrist joint greatly reduces your chances of wrist injury during other athletic pursuits.

2. Our program will incorporate the Fatigue/Tension principle. This means:

   - Short rests between exercises for the same muscle group, or no rest between exercises for different muscle groups.
   - Use of relatively heavy weights. General guideline—in a 6 to 8 rep set, the last two reps should be nearly impossible.
   - Adjusting exercises to match resistance to muscle leverage.

3. We will let the Interdependency of Muscle Groups dictate exercise order. The result:

   - Wrist extensor exercises will precede brachioradialis exercises.
   - Finger flexor exercises will come last.

4. We will only use exercises that put minimal stress on the elbow and the wrist joints.

PROGRAM SECTION

Now, down to specifics. You may already be familiar with some of the following exercises, but keep two things in mind:

1. The descriptions contain certain fine points of form you are probably *not* familiar with. These fine points can elevate an exercise from "workable" to "incredible!" Give them a chance.

2. Remember synergism: We optimize on all levels. First, applying the laws of biomechanics, we make each exercise as effective as possible. Then, we work to discover the optimum order. In the final analysis, **it's not so much the exercises themselves as their *sequence* and *timing* that makes Power ForeArms! such an effective conditioning tool.**

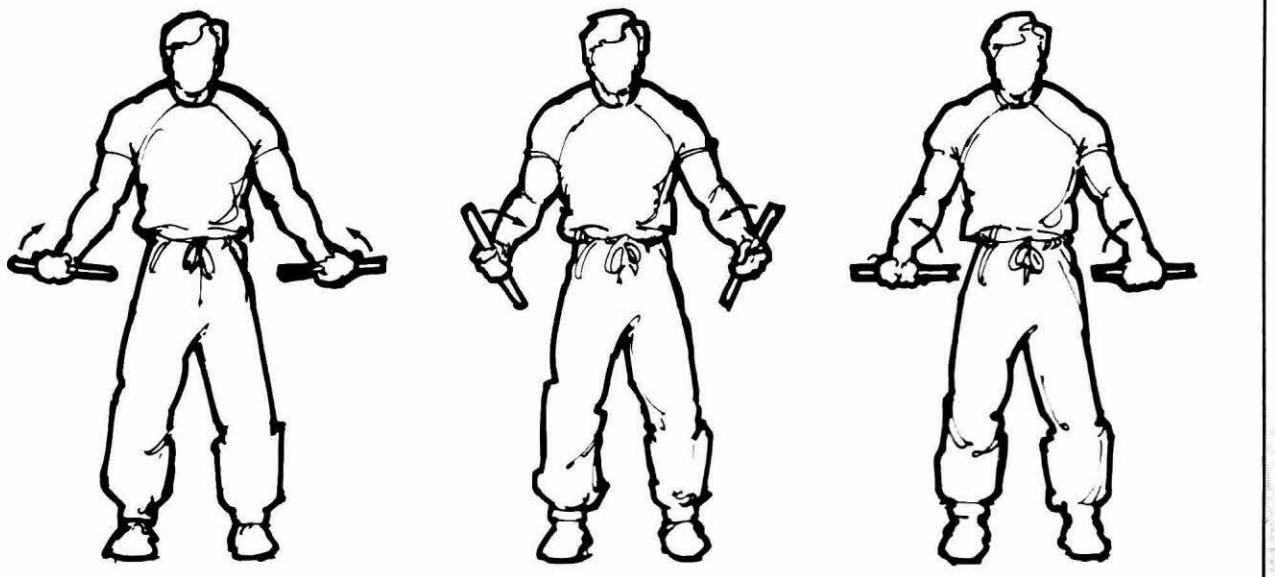
THE EXERCISES

Wrist Twists With Pipes

directly: pronators/supinators;
indirectly: extensors/flexors

This exercise warms up your forearms and wrists. Needed: two dumbell bars (dumbells with no plates on either end), or other heavy pipes twelve to fifteen inches long.

Grasp dumbell bars in the center, one in each hand. Extend your arms out to your sides. Your hands should be about eighteen inches from your body. Gripping the bars **as tightly as possible**, twist bars back and forth at a rate of about 1 back/forth twist per second. Continue for 45 seconds to 1 minute.



Position 1 Position 2 Position 3

Next, bend arms at elbows so forearms are parallel to the ground, and, once again, twist bars for 45 seconds to 1 minute.

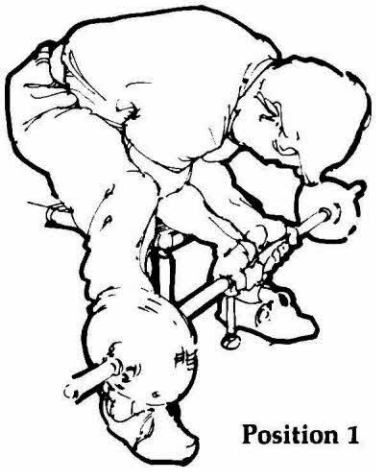
Wrist Curls

wrist flexors with forearms supinated

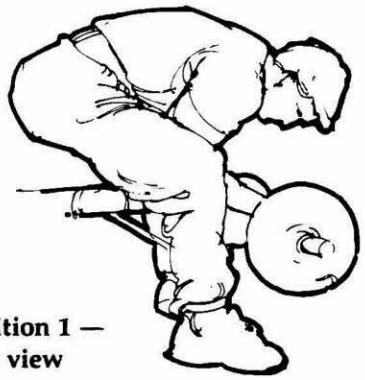
Grip a barbell, palms up, with your hands about six inches apart. Straddle an exercise bench, and let about half of your forearms extend over the end. Brace your arms against the inside of your knees. Let your wrists bend back and slightly open your fingers, then curl the weight up as far as you can go. Repeat.

Let your elbows rise off the bench at the bottom of the motion. Doing so will more closely match the resistance of the exercise with the leverage of the forearm flexors. Result: you will be able to use more weight—and massive forearms only come from a hefty overload!

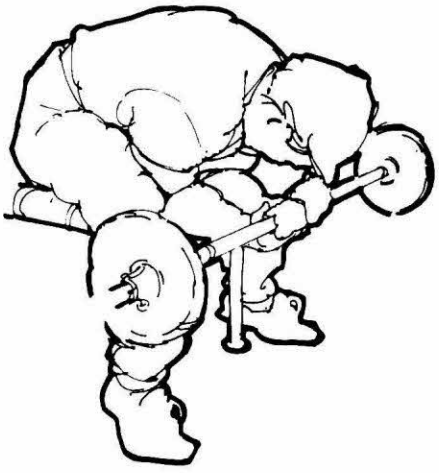
You can vastly increase the effectiveness of the exercise by **gripping the bar tightly throughout the motion.** But *do not* open your hands or roll the bar to the tips of your fingers, as this may burn out the finger flexors and limit the effectiveness of your workout.



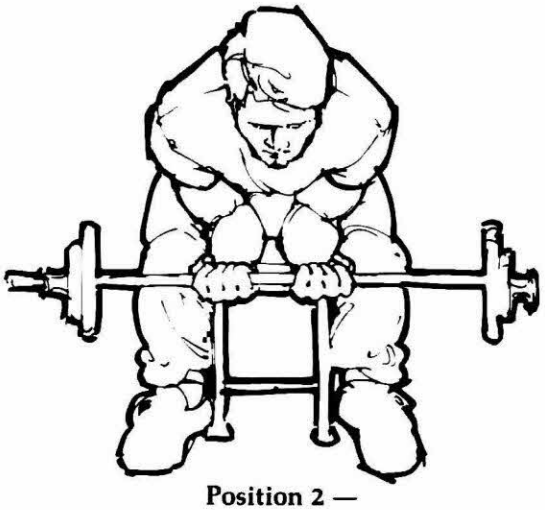
Position 1



Position 1 — side view



Position 2



Position 2 — front view

Reverse Wrist Curls

directly: wrist extensors
indirectly: brachioradialis

Take a slightly wider than shoulder width grip on a barbell, palms down, and place your forearms on your knees as you sit on an exercise bench. Your wrists should be just beyond your knees; your forearms should be at a slight diagonal so your elbows are just outside of your thighs (see illustration below). In the starting position, *your elbows should be up off your legs,* your wrists bent down.

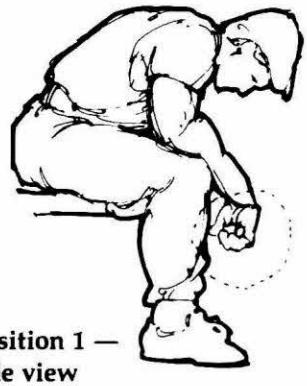
Now, simultaneously...

- bring your wrists up,
- rotate your elbows in so your forearms end up parallel to each other and your elbows end up down against your thighs,
- straighten your ankles until you're on tiptoe.

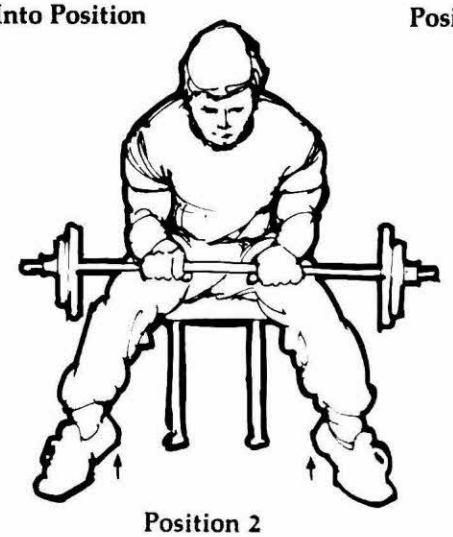
Return to starting position and repeat.

Getting Into Position

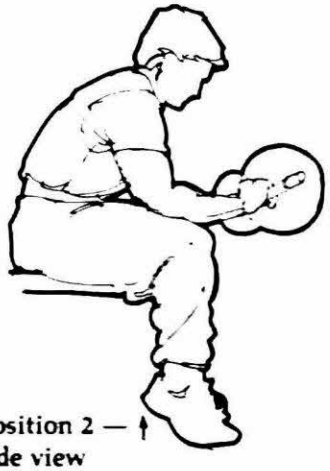
Position 1



Position 1 — side view



Position 2



Position 2 — side view

We cannot stress enough the importance of keeping an extremely tight grip on the bar. We are not talking about your standard clench. Hang on to that bar as if you were trying to squeeze it into dust!

Behind-the-Back Wrist Curls

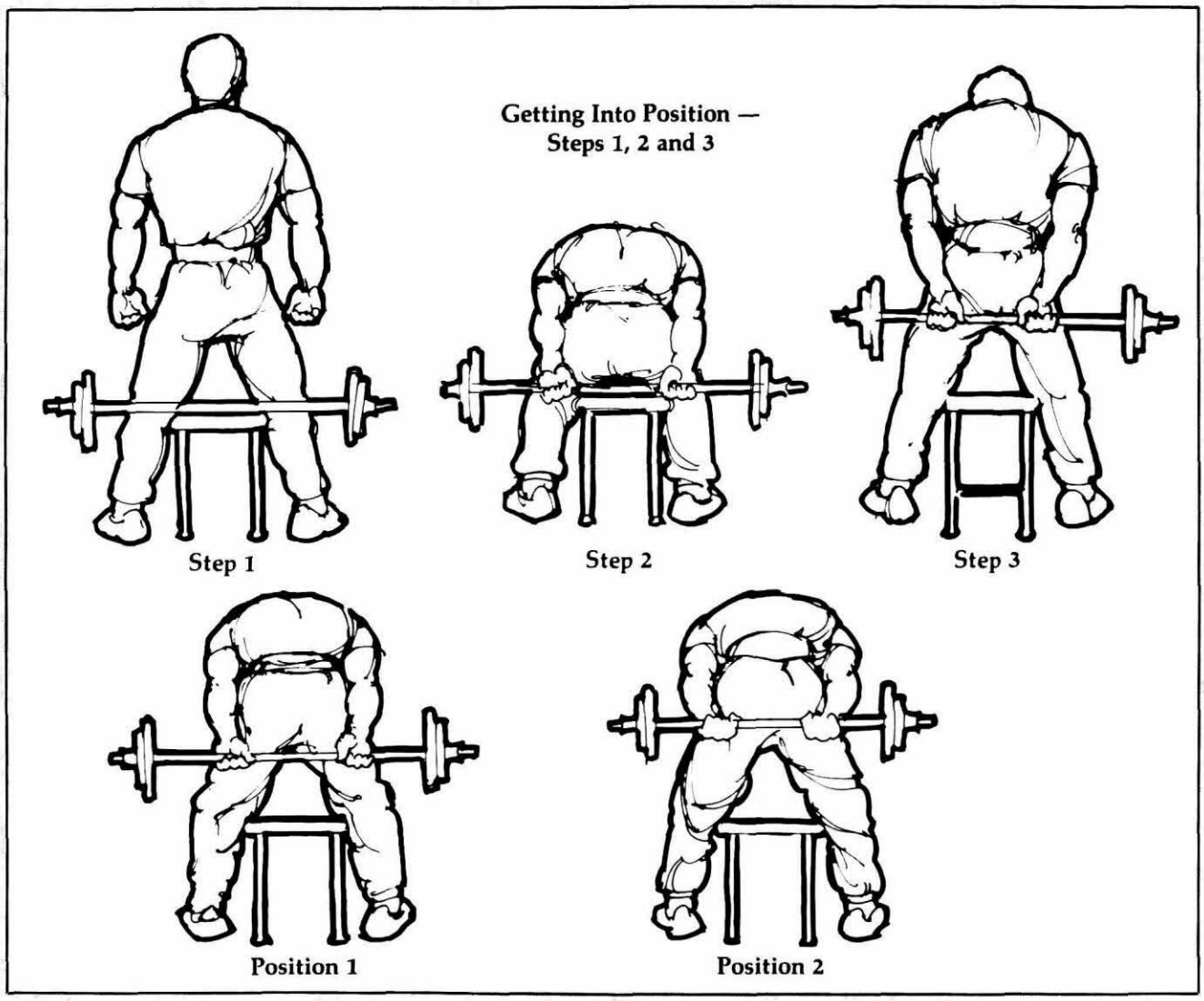
wrist flexors with forearms pronated

Put a barbell on a bench two to three inches from the end of the bench (see illustration). Straddle the bench, palms facing back. Bend forward and down, and pick up the bar with hands shoulder width apart.

Partially straighten up. This should leave you with your forearms against the outsides of your thighs and the bar hanging in space behind you. Narrow your grip slightly by sliding your hands toward one another.

Gripping the bar tightly (tightly!), curl it up as far as you can. Hold for one second, then lower the bar. Repeat.

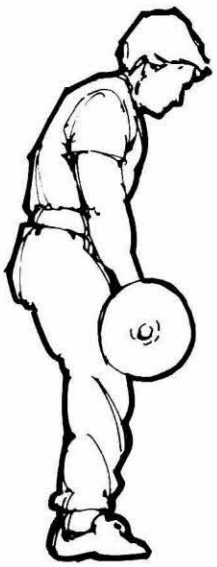
Note:
- If you don't really feel a burn, or if the position is uncomfortable, try using a still narrower grip.
- It's okay to use **a bit** of body motion to help you lift the weight.



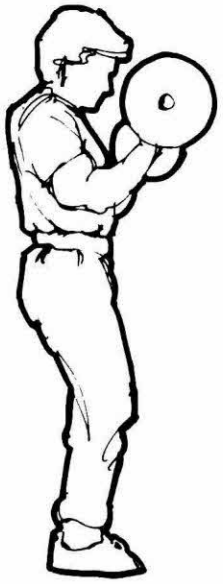
Reverse Curls

brachioradialis

Stand with your knees slightly bent, holding a barbell with hands **palms down,** about shoulder width apart. Without heaving your shoulders, whipping your arms, or snapping the muscles taught lift the weight until it touches your upper chest. Your elbows should come slightly forward as you lift, but they should **not** move out sideways! Then lower the bar. Repeat. (Remember to *think* your forearms into working—concentrate, feel the muscle contracting.)



Position 1



Position 2

The next three exercises make use of the Single Ended Dumbell (S.E.D.). Make one by taking the weights off one end of a regular dumbell.

S.E.D. Wrist Abduction

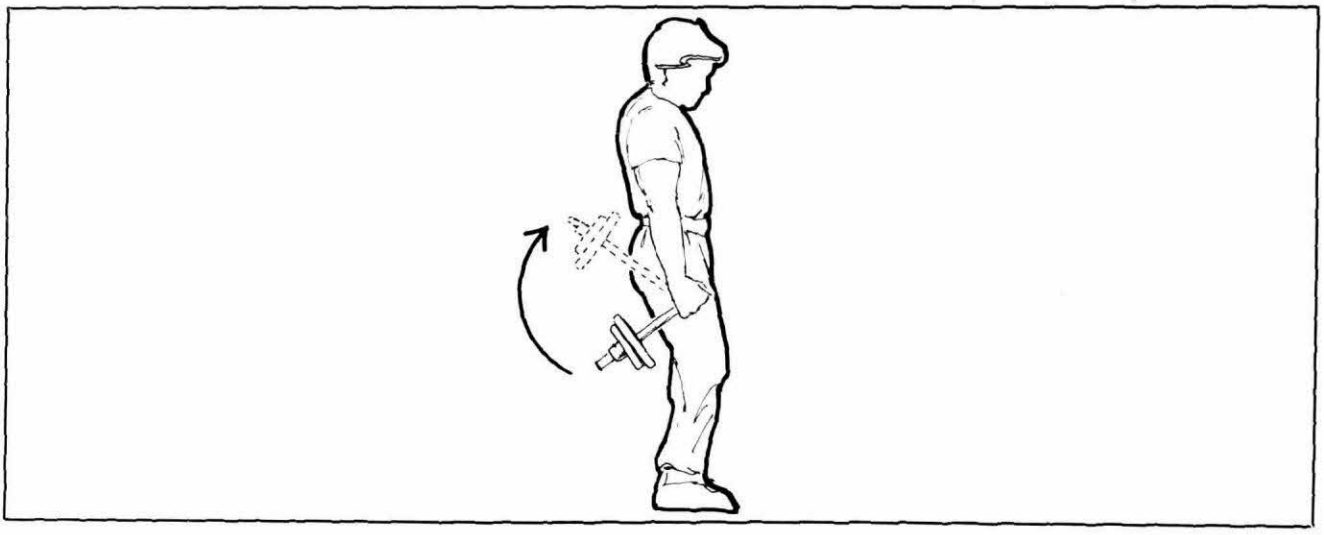
wrist abductors

Stand erect, holding the dumbell as close to the unweighted end as possible. The weight should be **in front** of you. Keeping your grip tight, lower the bar until it is pointing downwards. Your elbow, thumb, and the weights on the dumbell should fall on a straight line. Bending only at the wrist, curl the bar up as high as it will go. Lower. Repeat for the desired number of sets and reps.

S.E.D. Wrist Adduction

wrist adductors

Same setup as above, but the weight should be **behind** you. Keeping your grip tight, lower the bar until it is pointing downwards. Your elbow, thumb, and the weights on the dumbell should still fall on a straight line. Bending only at the wrist, curl the bar up as high as it will go. Lower. Repeat for the desired number of sets and reps.



S.E.D. Wrist Twists

forearm pronators/supinators

Same setup as above, but seated. Brace your forearm on a workout bench (not your knee; that position is too unstable). Keep your wrist locked so the bar forms a 90° angle to your arm. Rotate your forearm, lowering the weight **to the side** as far as it will go—first to the inside (to the left if you're holding the S.E.D. in your right hand) and then to the outside.

Position 1

Position 2

Repeat.

You should feel an intense stretch along the edge of the bone on the thumb side of your forearm. Be careful to control the weight throughout the motion. Letting it flop from one side to the other can result in strained wrist tendons.

Grip Work

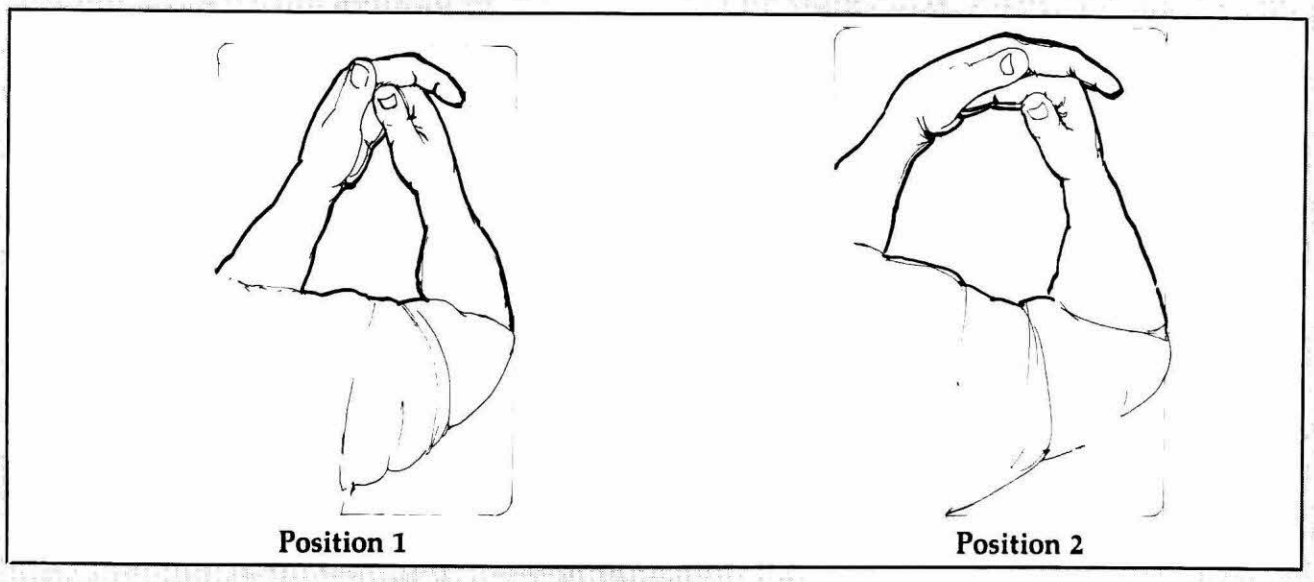
finger flexors

Assume the same position you used for Wrist Curls. Instead of keeping a tight grip and curling at the wrists, loosen your grip, allow the bar to roll to the tips of your fingers (don't drop it!), and then curl back up at the fingers. See Wrist Curl illustration, #1, for starting position.

Finger Extension

finger extensors

Cup your left hand over the back of your right hand, with both thumbs pointing toward you. You should have contact along the entire length of your fingers. Providing **moderate resistance** with the palm of your left hand, completely straighten the fingers of your right hand. (This is not an isometric exercise.) Repeat for the desired number of reps. Switch hands and follow same procedure.



Position 1 **Position 2**

Flexibility

Time to deal with a pervasive myth: Yes, any exercise that involves repeated muscle contraction **can** decrease the flexibility in the associated muscle groups. But it doesn't have to. In fact, if you stretch as well as weight-train, you will develop more flexibility more quickly, experience much less of the pain usually associated with stretching, and suffer less soreness from the weight workout!

In other words, flexibility exercise combined with strength exercise can be synergistic.

We highly recommend supplementing **Power ForeArms!** with the following stretch routine. It takes just a minute or two and will decrease your chances of injuring your wrists or forearms in daily life (not to mention in the gym or dojo!).

Back-of-Wrist Stretch #1

tendons running down back of wrist

Make a fist and bend your hand forward at the wrist. Then, use the palm heel of your free hand to push in and down on the middle knuckles of your first two fingers, concentrating on keeping your hand closed. If you're doing it properly, you should feel the stretch on the back of your hand and wrist. Remember not to strain. Keep pushing for about 10 seconds and then release. Repeat with other hand.

Back-of-Wrist Stretch #2

thumb tendons and tendons running down back of wrist

Bend your hand forward at the wrist and apply pressure against your thumb by pressing your thumb toward your wrist with your free hand. Press for about 10 seconds and then slowly release. Repeat with other hand.

Front-of-Wrist Stretch

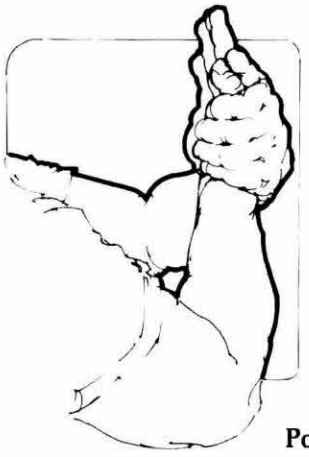
tendons running down front of wrist

Bend your hand back at the wrist and press down on your fingers with your open free hand. Try to keep the fingers straight on the hand being stretched. Press of about 10 seconds, then release. Repeat with other hand.

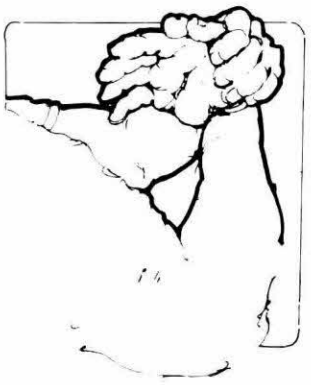
Wrist Tendons #1

rotational flexibility

Place your left thumb on the back of your right hand near your right little finger. Wrap your left hand fingers around the edge of your right hand on the thumb side into your right palm. Gently twist your wrist by pushing forward with your left thumb. Hold for 5 seconds, then release. Reverse hands, and repeat with other hand.



Position 1



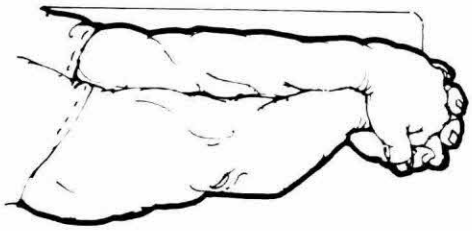
Position 2

Wrist Tendons #2

rotational flexibility

Extend your arms straight out in front of you at shoulder level with your palms facing out. Cross your right arm over your left and interlock the fingers. Following a circular path, slowly twist your clasped hands down, around, and through the frame created by your body, arms and hands. Push your hands forward as far as possible or until you have completed the circle and your arms are tied up in knots and pointing in front of you once again.

After 5 seconds, reverse the motion and then start from the beginning with your left arm crossed over your right. 1 rep each side.



Position 1

Position 2

THE ROUTINES

Power ForeArms! is composed of two program Levels. Both Level 1 and Level 2 routines include four *supersets* (two exercises, one each for each of the muscle groups in an opposing pair; the exercises are performed back-to-back without rest).

In this program, you don't rest between supersets. In fact, **you never rest at all!** When you finish one exercise, drop the weight, pick up the next one, and keep going. Good luck!

LEVEL 1

Exercise	*Goal/Reps*
Wrist Twists with Pipes, arms extended	1 minute
Wrist Twists with Pipes, arms bent	1 minute
no rest	
Wrist Curls	6 reps.
no rest	
Reverse Wrist Curls	8 reps.
no rest	
Wrist Curls	6 reps.
no rest	
Reverse Wrist Curls	8 reps.
no rest	
Behind-the-Back Wrist Curls	6 reps.
no rest	
Reverse Curls	6 reps.
no rest	

Exercise	*Goal/Reps*
Behind-the-Back Wrist Curls	6 reps.
no rest	
Reverse Curls	6 reps.
no rest	
S.E.D. Wrist Abductions	8 reps.
no rest	
S.E.D. Wrist Adductions	8 reps.
no rest	
repeat abduction/adduction superset with other hand	
no rest	
S.E.D. Wrist Twists	8 reps.
repeat with other hand	
no rest	
Grip Work	8 reps.
no rest	
Finger Extensions, each hand	15 reps.

LEVEL 2

Exercise	*Goal/Reps*
Wrist Twists with Pipes, arms extended	1 minute
Wrist Twists with Pipes, arms bent	1 minute
no rest	
Wrist Curls	8 reps.
no rest	
Reverse Wrist Curls	8 reps.
no rest	
Wrist Curls	8 reps.
no rest	
Reverse Wrist Curls	8 reps.
no rest	
Wrist Curls	8 reps.
no rest	
Reverse Wrist Curls	8 reps.
no rest	
Wrist Curls	8 reps.
no rest	
Reverse Wrist Curls	8 reps.
no rest	
Behind-the-Back Wrist Curls	8 reps.
no rest	
Reverse Curls	8 reps.
no rest	

Exercise	*Goal/Reps*
Behind-the-Back Wrist Curls	8 reps.
no rest	
Reverse Curls	8 reps.
no rest	
Behind-the-Back Wrist Curls	8 reps.
no rest	
Reverse Curls	8 reps.
no rest	
Behind-the-Back Wrist Curls	8 reps.
no rest	
Reverse Curls	8 reps.
no rest	
S.E.D. Wrist Abductions	8 reps.
no rest	
S.E.D. Wrist Adductions	8 reps.
no rest	
repeat abduction/adduction superset with other hand	
no rest	
S.E.D. Wrist Twists	8 reps.
repeat with other hand	
no rest	
Grip Work	8 reps.
no rest	
Finger Extensions, each hand	15 reps.

OPTIONAL STRETCH ROUTINE

Back-of-Wrist Stretch #1	10 seconds each hand
Back-of-Wrist Stretch #2	10 seconds each hand
Front-of-Wrist Stretch	10 seconds each hand
Wrist Tendons #1	10 seconds each hand
Wrist Tendons #2	10 seconds each hand

HOW MUCH, HOW OFTEN

Beginners should start with the Level 1 routine. If you don't feel a "burn" at the end of the workout, next time try Level 2. Those who have been training two years or more may start with Level 2. In either case, bear in mind it takes about 36 hours for muscle tissue to recover from a heavy overload, so the routines **should not be done more than three times per week!** We recommend two.

If possible, arrange your overall workout so there is at least one day after **Power ForeArms!** before working any major upper body muscle group (chest, back, or arms). Performing forearm work one day or less before working chest, back, or arms can result in overstressed wrists, due to the combination of forearm fatigue plus the heavy weights involved in working the upper body. The best time to do **Power ForeArms!** is immediately after you work chest, back, and arms. That way, you allow your forearms maximum recovery time before your next upper body workout.

The same principle applies for martial artists and other athletes. Performing forearm work one day or less before punching the heavy bag increases your risk of wrist injury. Doing **Power ForeArms!** immediately after a heavy bag workout allows your forearms maximum recovery time. *Finish* your workouts with forearm work.

Examples:

If you work your whole body three days per week, do the **Power ForeArms**! routines at the end of each of those workouts.

Mon	Wed	Fri
Whole body	Whole body	Whole body
Power ForeArms!	**Power ForeArms!**	**Power ForeArms!**
Forearm stretches (optional)	Forearm stretches (optional)	Forearm stretches (optional)

If you use a split routine (different bodyparts on different days), try to leave as much time between your forearm workouts and your chest, back, and arm workouts as possible.

Six-day split (each bodypart three times per week)

Mon	Tues	Wed	Thurs	Fri	Sat
Lower Body	Upper Body	Lower Body	Upper Body	Lower Body	Upper Body
	Power ForeArms!		**Power ForeArms!**		**Power ForeArms!**

or... (each bodypart two times per week)

Mon	Tues	Wed	Thurs	Fri	Sat
Lower Body	Upper Body	**Power ForeArms!**	Lower Body	Upper Body	**Power ForeArms!**

Four-day split (each bodypart two times per week)

Mon	Tues	Thurs	Fri
Lower Body	Upper Body **Power ForeArms!**	Lower Body	Upper Body **Power ForeArms!**

If you choose to include the optional stretch routine, do it after you finish your **Power ForeArms!** workout.

For the amount of weight to use in each of the exercises, follow the guideline mentioned earlier: the proper weight will render the last two reps of a 6 to 8 rep set nearly impossible.

To observe this guideline, you will probably have to change the weight for each of the exercises within a particular superset. Using two barbells with different weights can make things a lot easier, as it minimizes the time lost (and results lost!) shuffling weights in the middle of a superset.

One final note. We have mentioned two synergisms: Fatigue/Tension and Interdependency of Muscle Groups. There is a third—Mental Focus. We can't emphasize enough the importance of a positive outlook and belief in your goal. This is crucial for maximizing the effectiveness of your workout, maximizing results, and maximizing enjoyment. Everything in the body starts with the mind. Belief in what you are doing and in yourself is the key to making the whole greater than the sum of the parts.

Happy Training!

GLOSSARY

Abduction, wrist: Bending the wrist toward the thumb.

Adduction, wrist: Bending the wrist toward the little finger.

Brachioradialis: A muscle running from the elbow to the radius; assists in flexing the elbow.

Brachialis: An upper arm muscle that assists in flexing the elbow.

Biceps Brachii: An upper arm muscle that assists in flexing the elbow and supinating the forearm.

Extension, elbow: Straightening the elbow.

Extension, fingers: Straightening the fingers.

Extension, wrist: Bending the wrist back.

Extensor Carpi Radialis: A muscle running from the elbow to the back of the wrist behind the thumb; assists in extension and abduction of the wrist.

Extensor Carpi Ulnaris: A muscle running from the elbow to the back of the wrist behind the little finger; assists in extension and adduction of the wrist.

Extensor Digitorum: A muscle group running from the elbow to the fingers; assists in straightening the fingers.

Muscle Fatigue: The decreased capacity of a muscle to contract as a result of previous exertion; a function of overload and timing.

Fatigue/Tension Level: The degree of exhaustion of a muscle at any given point during exercise.

Fatigue/Tension Principle: A concept that interrelates fatigue and tension and the effect of varying these during exercise.

Fatigue/Tension Threshold: The minimum Fatigue/Tension level necessary for muscle growth.

Flexion, elbow: Bending the elbow.

Flexion, fingers: Bending the fingers.

Flexion, wrist: Bending the wrist forward.

Flexor Carpi Radialis: A muscle running from the elbow to the front of the wrist behind the thumb; assists in flexion and abduction of the wrist.

Flexor Carpi Ulnaris: A muscle running from the elbow to the front of the wrist behind the little finger; assists in flexion and adduction of the wrist.

Flexor Digitorum: A muscle group running from the elbow to the fingers; assists in bending the fingers.

Leverage: The mechanical advantage provided by position.

Load: The opposition to motion provided by weight.

Overloading: Forcing a muscle to act against resistance greater than that which it can easily overcome.

Pronation: Rotation of the forearm resulting in the hand facing palm down.

Pronator Quadratus: A muscle running from the ulna to the radius; assists in pronating the forearm.

Pronator Teres: A muscle running from the elbow to the radius; assists in pronating the forearm.

Radius: One of two bones running the length of the forearm; found on thumb side.

Resistance: The opposition to motion resulting from the combined effect of load and leverage.

Superset: Two exercises, one each for each of the muscle groups in an opposing pair performed back-to-back without rest.

Supination: Rotation of the forearm resulting in the hand facing palm up.

Supinator: A muscle running from the elbow to the radius; assists in supinating the forearm.

Synergism: Combining elements to create a whole greater than just the sum of those elements.

Tension: Muscular contractile force.

Timing: The combination of repetition speed, rests between sets, and rest between exercises.

Ulna: One of two bones running the length of the forearm; found on little finger side.